REMARKS

Reconsideration is respectfully requested.

In the Office Action dated August 25, 2004, Claims 1-17 are rejected. Applicants have cancelled Claims 18-31. By the present Amendment, Applicants have amended the title, the specification, the claims, and the abstract.

By the present Amendment, the title has been amended to more accurately reflect the claimed invention and the Abstract has been amended to overcome the objection thereto and now meets the guidelines, including not exceeding 150 words in length.

By the present Amendment, the specification has been amended to further define several well-known and long used trademarks of third parties by further describing the compounds with their respective accepted generic dictionary definition terminology.

The objection in the Office Action to Claims 13 and 17 regarding recitation of trademarks, instead of generic terminology, has also been overcome by the amendment of those claims. The rejection of Claims 4-6 and 11 under 35 U.S.C. §112, second paragraph, as being indefinite, has also been overcome by amendment thereof, so as to consistently recite in the claims first and second inorganic fiber sheets. Additional non-substantive amendments have been made to Claims 4, 7, 8, 10, 11 and 15 and new Claims 32-34 have been added to more specifically point out and distinctly claim the subject matter considered to comprise Applicants' invention. These amendments were made to correct informalities, and not for any reason related to patentability. Claim 6 has been rendered as an independent claim, including all of the limitations present in Claim 1, upon which it previously was dependent. No new matter has been added.

In the Office Action, Claims 1-6 and 9-11 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 4,303,722 (Pilgrim) in view of U.S. Pat. No. 4,265,979 (Baehr et al.) and U.S. Pat. No. 6,475,313 (Peterson et al.). Claims 7 and 15-17 are rejected under 35 U.S.C. §103(a) as being unpatentable over Pilgrim in view of U.S. Pat. No. 5,397,631 (Green et al.), Baehr et al. and Peterson et al. Claim 8 is rejected under 35 U.S.C. §103(a) as being unpatentable over Pilgrim in view of U.S. Pat. No. 5,718,797 (Phillips et al.), Baehr et al. and Peterson et al. Claims 12 and 13 are rejected

under 35 U.S.C. §103(a) as being unpatentable over Pilgrim in view of U.S. Pat. No. 5,476,567 (Fujisawa et al.), Baehr et al. and Peterson et al. Claim 14 is rejected under 35 U.S.C. §103(a) as being unpatentable over Pilgrim in view of U.S. Pat. No. 4,488,917 (Porter et al.), Baehr et al. and Peterson et al.

A. The Rejection of Claims 1-6 and 9-11 is Improper

The rejection of Claims 1-6 and 9-11 under 35 U.S.C. §103(a) as being unpatentable over U.S. Pat. No. 4,303,722 (Pilgrim) in view of U.S. Pat. No. 4,265,979 (Baehr et al.) and U.S. Pat. No. 6,475,313 (Peterson et al.) is improper.

Applicants claim a method of manufacturing a gypsum board which is dynamic and a continuous process wherein a wet gypsum slurry is deposited on a first inorganic fiber sheet forming a first wet gypsum layer, a gypsum slurry having a different consistency (Claim 2) is deposited on the wet gypsum layer, and a second sheet having a gypsum deposited on it is applied to the gypsum layer previously deposited on the first wet gypsum layer. The three layer board is then formed into a desired thickness and dried. One important feature of this claimed process is that the gypsum in the first wet layer, the core gypsum layer and the third gypsum layer are all in a wet state, thereby permitting a desirable intermingling of the gypsum slurry in a wet state into the gypsum of the adjoining/combined layers. In turn, this permits the combination of the three varying gypsum slurry layers to form acceptable and adjoining homogeneous recrystallization when the product in its entire gypsum state is converted from a wet slurry form (hemihydrate) to a dry product (dihydrate). This process provides for a greater bonding capacity between the layers, thus forming a stronger gypsum wallboard, composed of gypsum at all of its levels, whereby all levels are not bound together by an adhesive property but rather a mechanical property. The interface between the varying density layers is not planer (Pilgrims teaches that his product/process uses planar levels of interface at its adjoining layers), but rather these levels of topographically geometric interface are areas at which the gypsum crystals of the varying low and high density wet slurry's will grow into each other (whereby the

combined wet gypsum's will recrystallize) thus forming an interlocking/root like mechanical attachment, not an chemical adhesive attachment, as Pilgrim teaches.

In contradistinction, Pilgrim teaches a process for producing a laminate product, whereby a pre-coated glass mat or fabric is adhered to an already rigid substrate (a set dehydrate gypsum panel). Pilgrim does not teach a method for producing a glass reinforced gypsum board whereby the entirety of the board employs continuous and uninterrupted free growth of gypsum crystals that adhere to each other and to gypsum crystals in an adjoining layer. As pointed out in column 1, line 67 through column 2at line 39 of, Pilgrim describes a method whereby a pre-coated mat is laminated to a substrate and has a clear and definable adhesive layer between the two which physically separates the two. Moreover, in column 3, lines 13 through 43, Pilgrim discloses the basic pre-coating formulation for a glass mat. This formulation is clearly a coating and not a contiguous portion of an inner or core gypsum layer. To find a teaching in Pilgrim's pre-coating formulation the claimed polymer entrained dense gypsum surface layer, as is recited in the claims of the present application, is respectfully considered a mischaracterization of a class of materials providing a coating as opposed to a contiguous portion of the substrate produced by the inventive method claimed in the present application. This indication is further found in the coating, which contains approximately the preferable 35 to 45 percent thermosetting condensation polymer, as taught by Pilgrim, wherein the remaining gypsum serves not as a contiguous extension of the underlying rigid substrate, but as a separate layer further defined as "laminate skins", between which is disposed a substrate core. Pilgrim clearly identifies the gypsum as providing nothing more than a fire resistant filler to the coating (column 3, lines 23 through line 43). Moreover, Pilgrim also requires a release medium that must be removed before the gypsum/resin layers are adhered to the rigid substrate. It should be noted here that the resin in Pilgrim provides the adhesive function so that the layers adhere to each other.

Another difference becomes apparent with consideration of the combination using the additional Baehr et al. reference. The present application claims a method for producing a product that is throughout its entirety a Beta calcium sulfate hemihydrate (gypsum), having no adhesive interstices between the outer layer and the inner layer,

as Pilgrim has defined. Consideration of the method taught by Baehr et al., in combination with the method taught by Pilgrim, reveals a clearly defined difference between boards made in accordance with the teachings of the combination of these two patents and that of the method claimed by the present application. The density of the outer surface layers attributed to Baehr et al. is achieved by means of compression of the resulting wet gypsum board using rollers, which are used to compact the foamed gypsum and glass fiber composition into a composite sheet having undergone partial set of the gypsum prior to the core (lower density & foamed) gypsum material being applied. If this method were employed in conjunction with the method taught by Pilgrim, the glass mat would not be fully penetrated as the chopped glass component of Baehr's method would impede complete penetration. Thus, the proposed combination would not work in the same way as Applicants' claimed method, and would produce a totally different, and undesirable, product.

Another significant difference is in the outer surface layers of the product produced via the claimed method, which "are devoid of foam". As recited in Claim 3, the gypsum slurry is in fact the same slurry used to enclose both the face and back glass mats, that is, the surface layers, and is not the same slurry that is used for the lower density core. This is achieved by utilizing the common function of centrifuging and shearing the foam out of the slurry as it moves to the outer internal circumference of the formulation mixer. The incorporation of this very dense slurry in the surface layers in an encapsulating yet contiguous extension of the gypsum core which surrounds, passes through, and ultimately resides at a level equal to the outer surface of the product whereby the glass mat is not exposed.

It is a significant teaching in Baehr et al. that the process requires densifying the sheet via compressive forces. This is in no way similar to the polymer modified dense gypsum which is used by in the presently claimed inventive method to fully embed the incorporated face and back surface glass mats. Rather, providing the higher density polymer modified dense gypsum slurry as claimed in the present application does not require compression to attain higher polymeric addition, whereby the dense surface layer is formulated to be dense not in a stoichiometrically correct manner, but rather in a very loose and fluid manner so as to impart a characteristic which allows it to penetrate

through/throughout/around and completely encapsulate the glass mat fibers so as to be fully entrained within the dense gypsum, and thereby to create an uninterrupted polymer modified dense gypsum outer surface layer above/beyond the level of the glass mat.

The combination of the processes taught by Pilgrim and Baehr et al. is not similar to that of the claimed invention, and would not yield a similar resulting product as that of the method taught and claimed in the present application.

Furthermore, if this combination of methods were followed to an extreme that included Pilgrim's teachings, higher density would never be achievable, as a condensation polymer would not cure at a fast enough time interval. Thus, the mat would be stripped of the pre-coating Pilgrim sought to achieve leaving, a mat that would be less than completely penetrated, and of equal to lower density than that of the core.

Another distinguishing feature is more concisely pointed out in Claim 6, which has been rendered as an independent claim bin the accompanying claim amendment. That is, that the polymer added to the dense slurry layers is an "additive", and does not comprise a base material of the gypsum laminate, as is taught by Pilgrim. That is, Applicants claim an "additive" which is a term indicating minute amounts of polymer, in low concentrations, which are added to the dense gypsum slurry, such that the effects of the polymer additives provide the secondary function of providing a base for chemical bonds of the additive to finishing materials, such as paint or further coatings, such as the acrylic compounds which are applied in the steps recited in Claims 15 and 16. Of course, the primary function is supplied by the gypsum to gypsum recrystallization, which bonds the outer layers to the gypsum in the core gypsum middle layer. Thus, this term further distinguishes all of the cited references, and especially Pilgrim, which in contradistinction, teaches the resin not as an additive, but as a primary constituent of the laminate skins providing the very adhesive function to bond the outer laminate skins to the rigid middle layer of gypsum. Moreover, the large ratio range of the resin to gypsum, when considering the weight of each, is described as in the range of from about 1:1.6 to about 1:4.0, and preferably 1:1.8 to 1:2.2, Pilgrim, column 3, lines 13-23. That range places the resins squarely within the definition of a base material, and not that of an additive. Thus, Pilgrim cannot be said to teach an "additive" within accepted definitions of that term, and certainly not as is recited in Claim 6, when understood in

light of the specification description, the inventive method contemplating a dry solid ratio of additive to dry gypsum solids of at most, less than 1 %, and preferably much less in the dense slurry.

B. The Rejection of Claims 7 and 15-17 is Improper

Similarly, the rejection of Claims 7 and 15-17 is also improper, in that there is neither a specific teaching of an additive comprising the materials recited in Claim 17, nor of the acrylic coatings recited in Claims 7, 15 and 16 so as to bond to the polymer additives to the acrylic coatings as is specifically recited therein.

Moreover, the rejection relies on several references, such as to be an improper combination of the teachings of the references, relevant portions of which are taken as needed and pieced together to provide what appears to be a facsimile of the claimed invention as recited. This is an impermissible combination also because the elements of interest are utilized not because of any *a priori* reasons or incentive provided by the prior art, but in fact the elements are chosen only because of the knowledge gleaned from the claimed subject matter and the incentives introduced by the description. This is hindsight reasoning at best, and cannot be used to support the rejection as set forth in the Office Action.

C. The Rejection of Claims 8 and 12-14 is Improper

With regard to the other dependent Claims 8 and 12-14, patentability thereof is based at least on the patentability of the claims on which they depend, as argued above, and further on the above arguments regarding hindsight reasoning of the rejections as set for the above.

D. Remaining References

The disclosures of the remaining cited references, whether applied or not, have been reviewed and have not been found to add appreciably to the teachings of Pilgrim

and or Baehr et al. For example, Peterson et al. is relied upon for teaching a hinged forming plate. However, Peterson et al. do not teach the recited differentiated layers of gypsum slurry, the outer layers being of a denser material to provide structural integrity to the finished gypsum board product. (Peterson et al. apparently rely on the paper facings for this purpose, as bolstered by a fiberglass scrim embedded in the gypsum layer.

E. Conclusion

In view of the amendment to the claims, and of the arguments made above, Applicants consider that all the outstanding objections and rejections have been overcome. Accordingly, Applicants request reconsideration of the outstanding rejections and respectfully submit that this application is now in condition for allowance and respectfully requests an indication of such.

Respectfully submitted,

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